

# Managing the Java Thread Lifecycle: Layers Involved in Starting a Thread



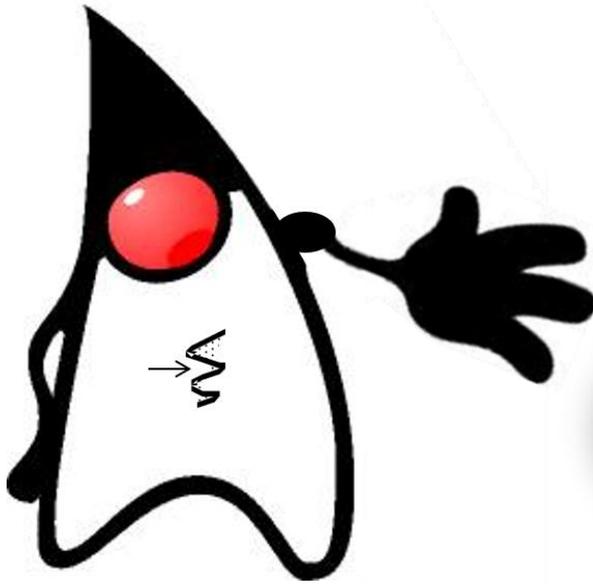
**Douglas C. Schmidt**  
**[d.schmidt@vanderbilt.edu](mailto:d.schmidt@vanderbilt.edu)**  
**[www.dre.vanderbilt.edu/~schmidt](http://www.dre.vanderbilt.edu/~schmidt)**

**Institute for Software  
Integrated Systems  
Vanderbilt University  
Nashville, Tennessee, USA**



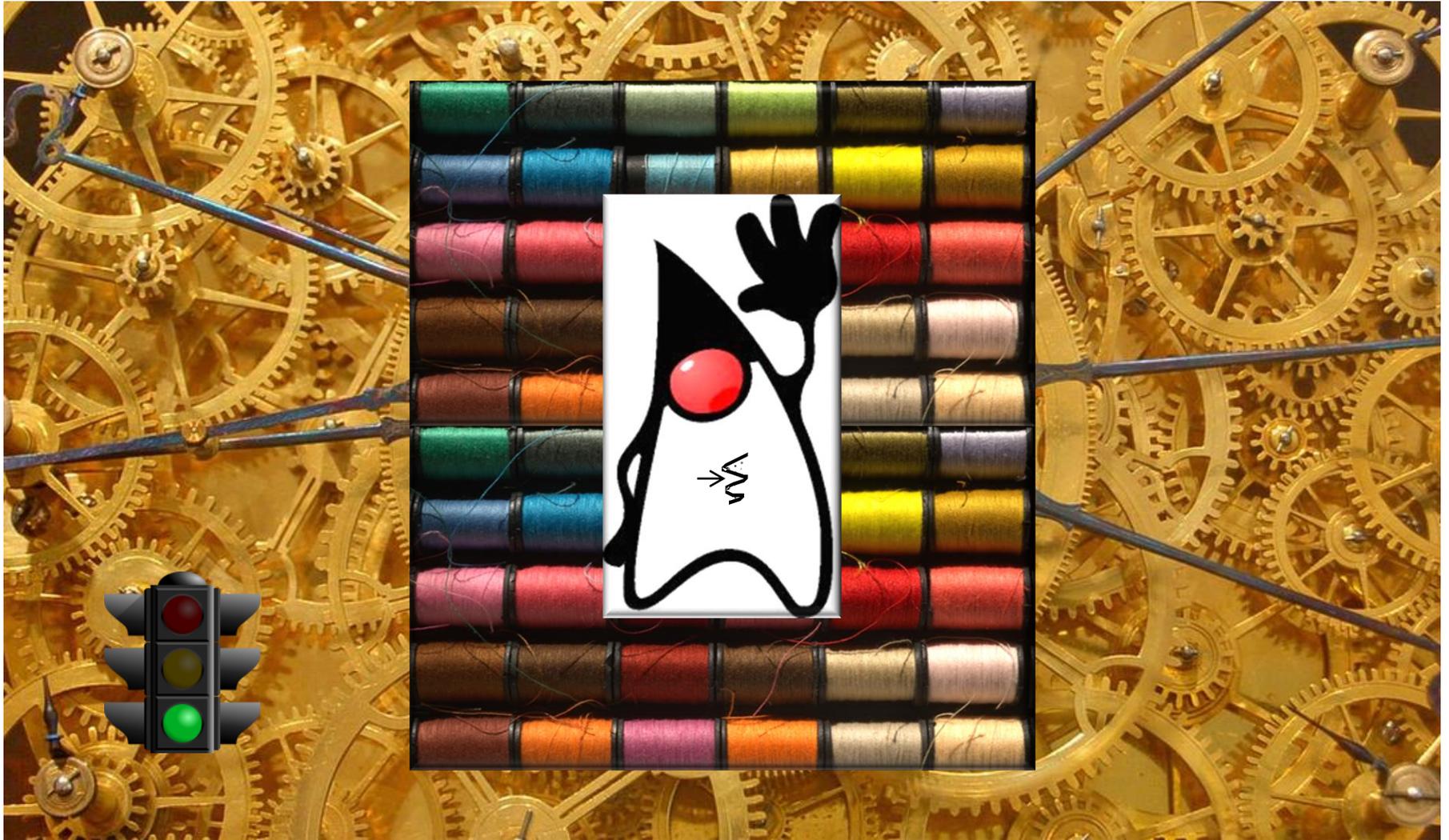
# Learning Objectives in this Lesson

- Understand the layers involved in starting a Java thread



# Layers Involved in Starting a Java Thread

- Starting a Java thread involves interesting design & implementation issues

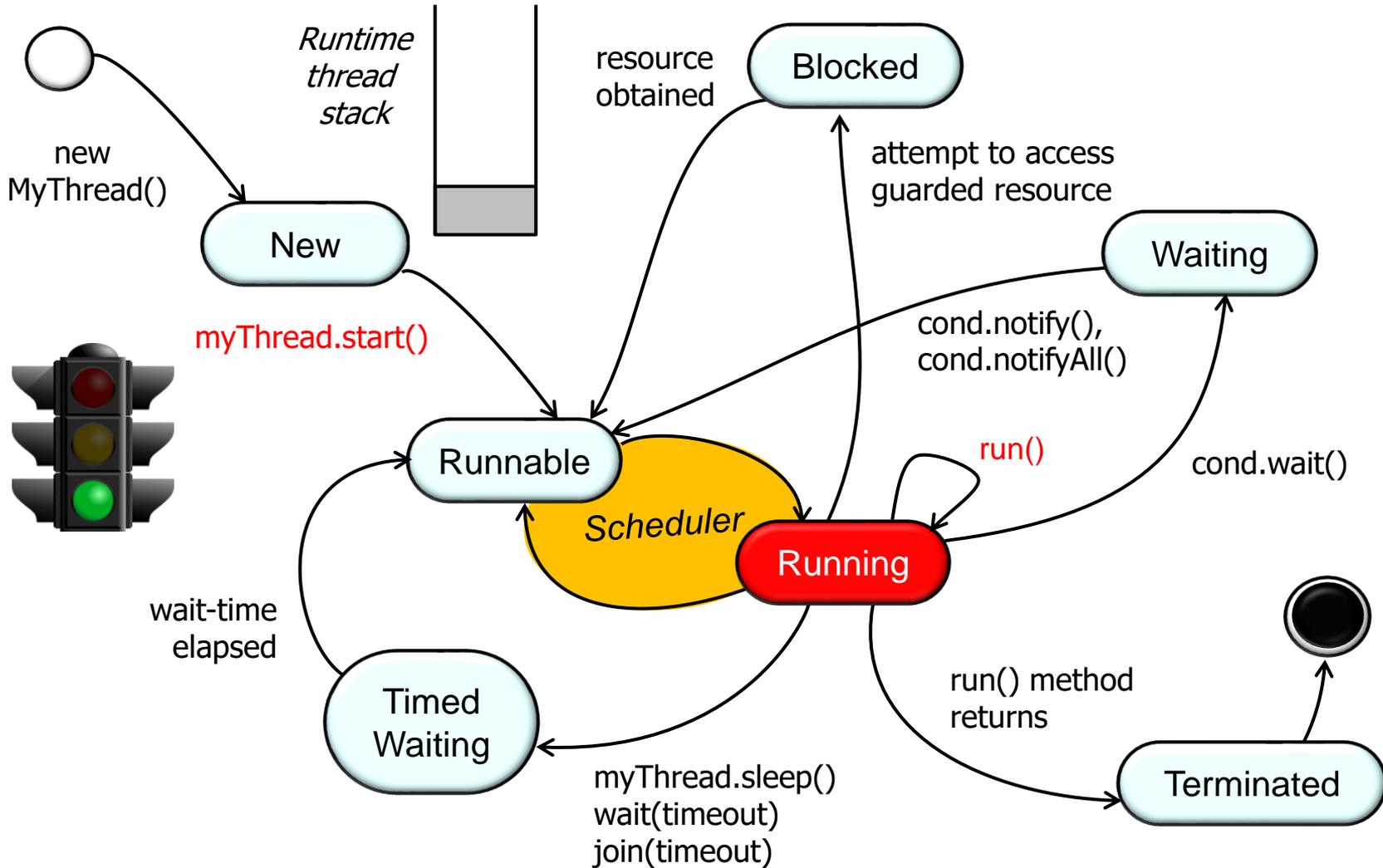


---

# Layers Involved in Starting a Java Thread

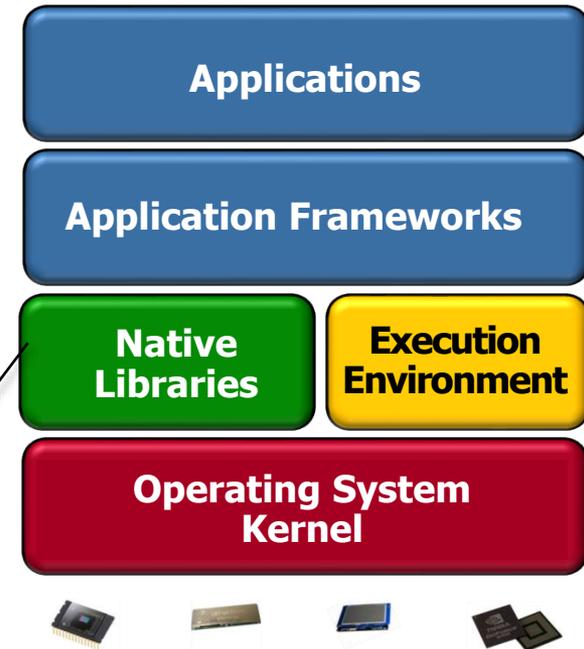
# Layers Involved in Starting a Java Thread

- Calling `start()` on a thread triggers the execution of its `run()` hook method



# Layers Involved in Starting a Java Thread

- The Java platform provides a stack of layers that define various mechanisms for running concurrent programs on a wide range of computing devices

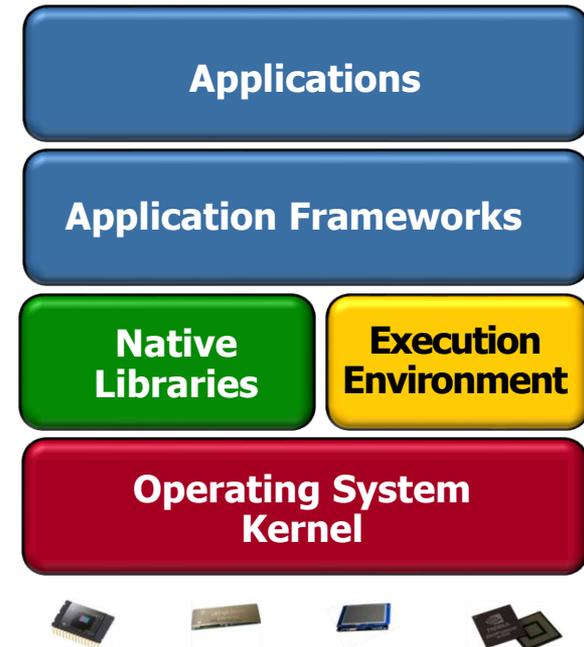
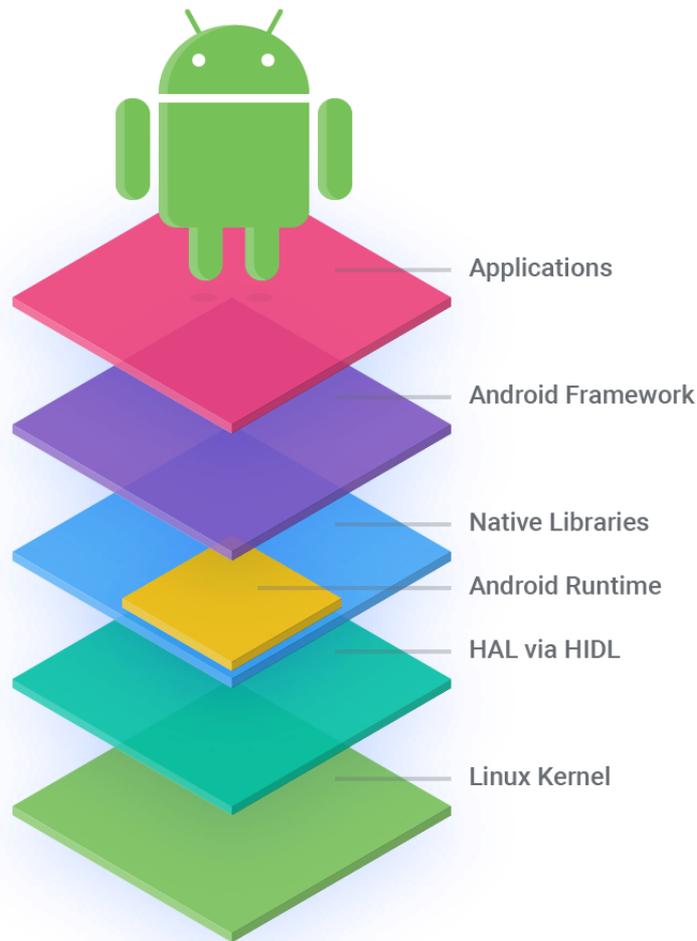


*Different versions of Android & Java implement these layers differently, though key levels of abstraction are often similar*

See [en.wikibooks.org/wiki/Java\\_Programming/The\\_Java\\_Platform](https://en.wikibooks.org/wiki/Java_Programming/The_Java_Platform)

# Layers Involved in Starting a Java Thread

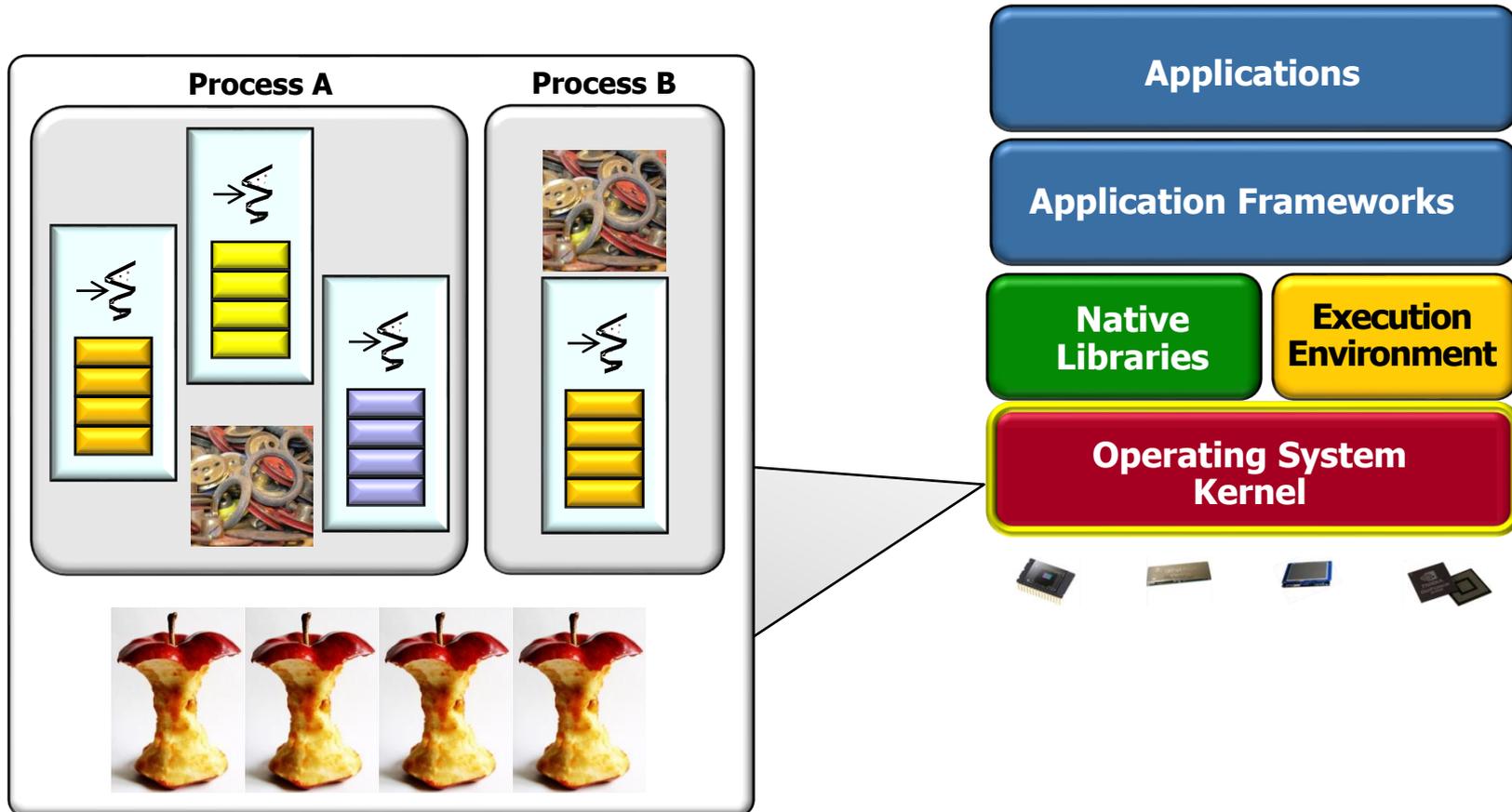
- Likewise, the Android platform provides a stack of layers that define various mechanisms for running concurrent programs on mobile computing devices



See [developer.android.com/guide/platform](https://developer.android.com/guide/platform)

# Layers Involved in Starting a Java Thread

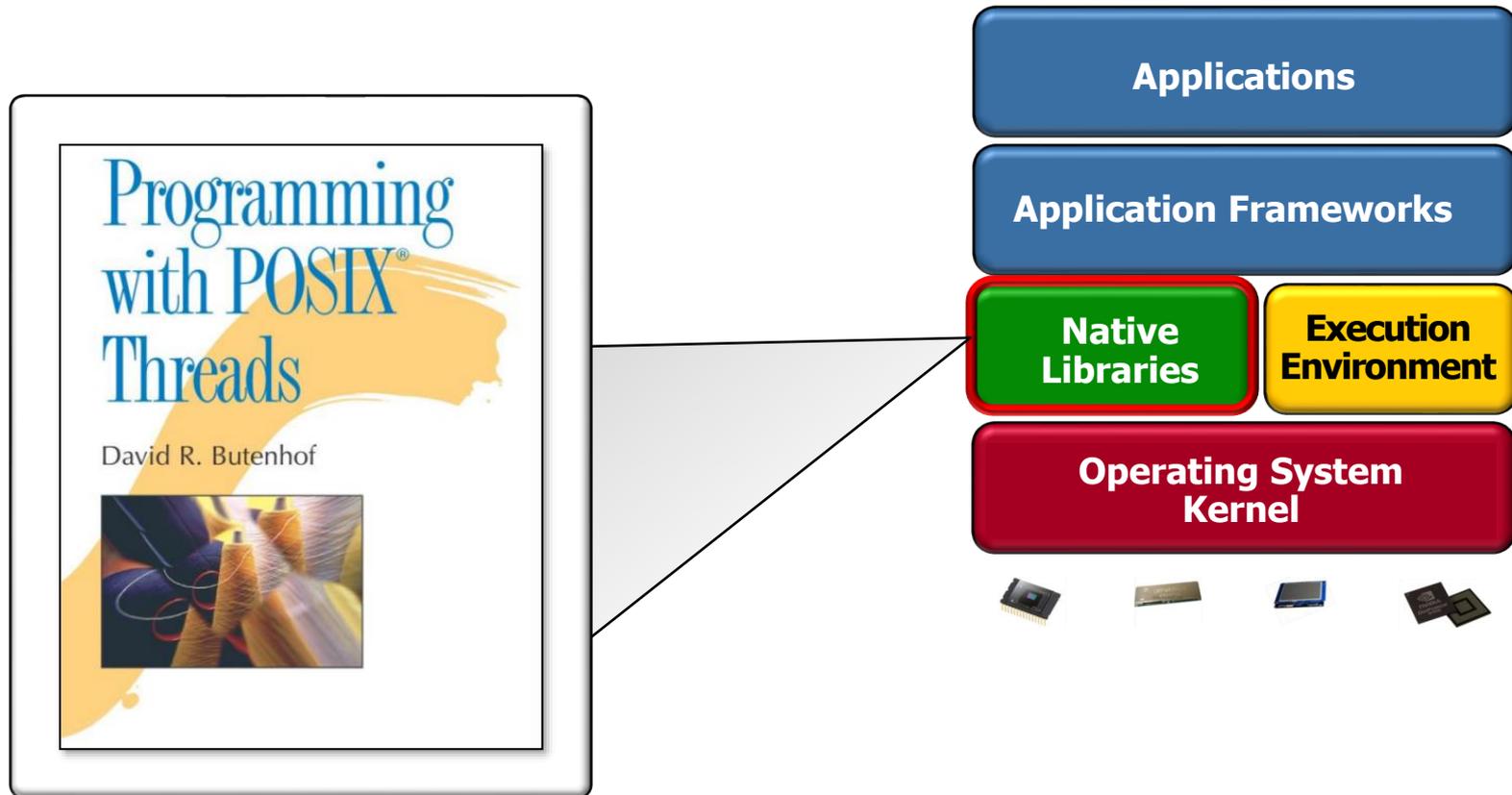
- Likewise, the Android platform provides a stack of layers that define various mechanisms for running concurrent programs on mobile computing devices



The Android Linux kernel controls hardware & manages system resources

# Layers Involved in Starting a Java Thread

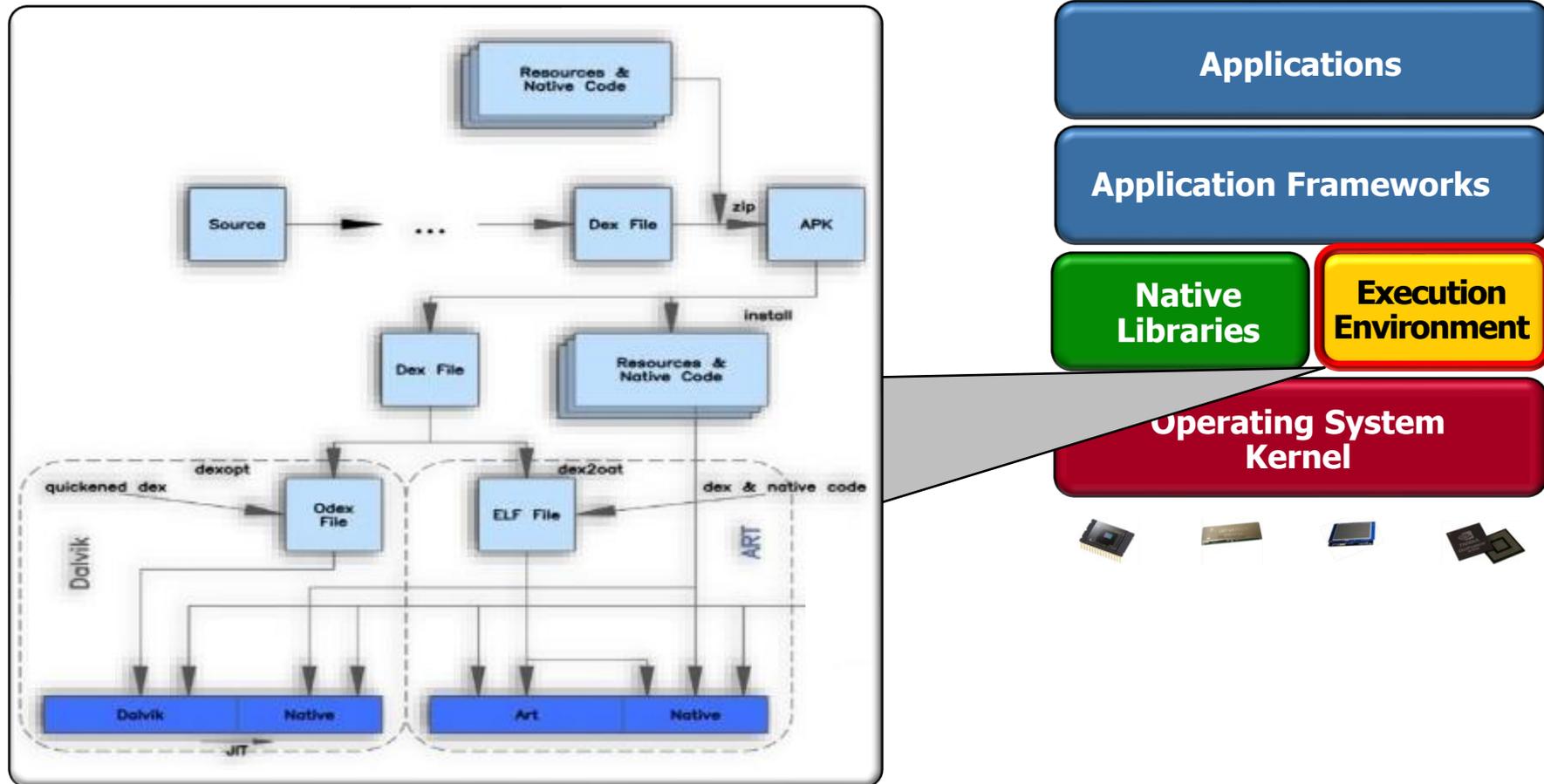
- Likewise, the Android platform provides a stack of layers that define various mechanisms for running concurrent programs on mobile computing devices



The Bionic LibC library supports the Pthreads C programming APIs

# Layers Involved in Starting a Java Thread

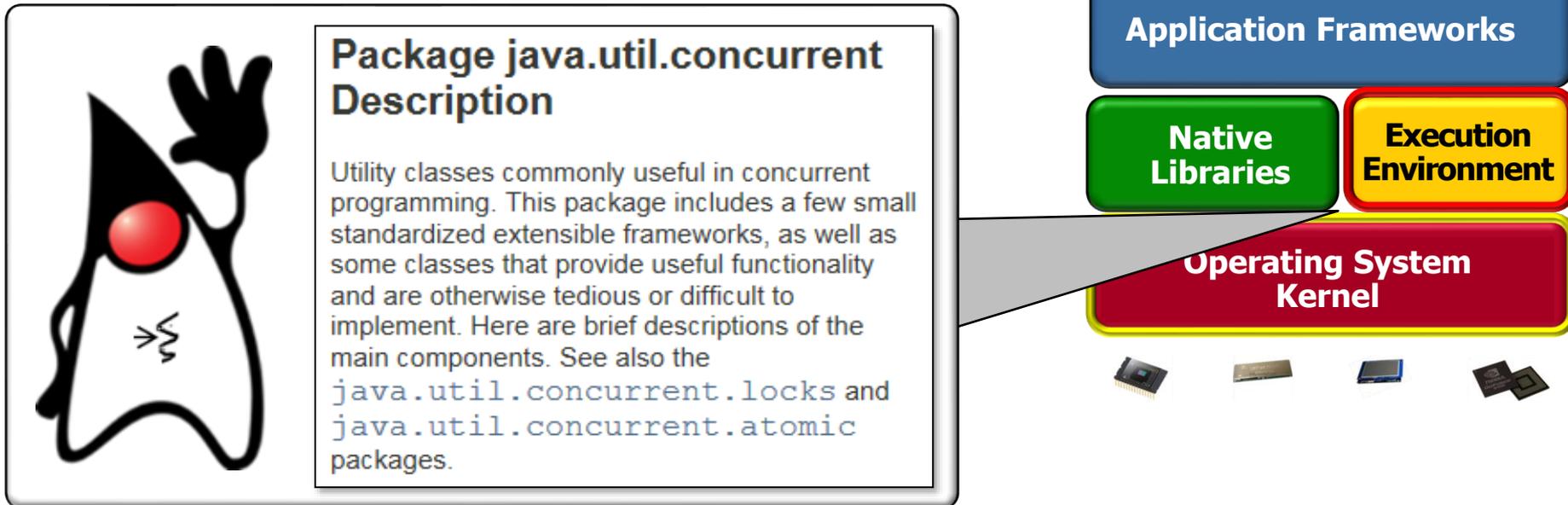
- Likewise, the Android platform provides a stack of layers that define various mechanisms for running concurrent programs on mobile computing devices



Dalvik & ART provide a managed execution environment for Java apps

# Layers Involved in Starting a Java Thread

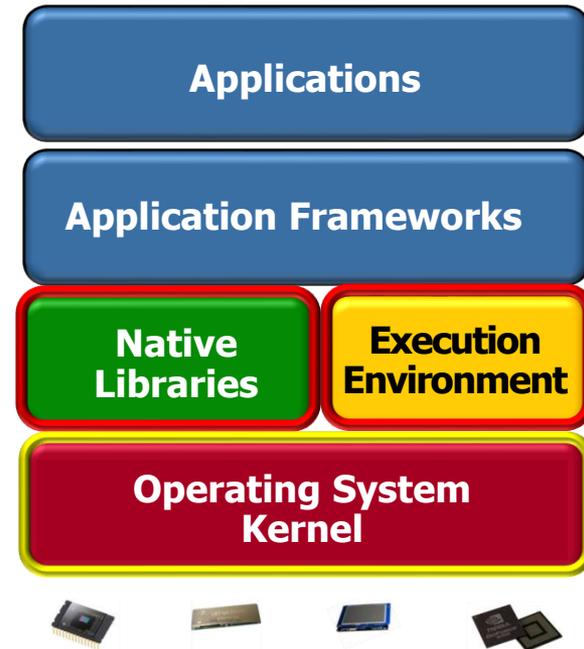
- Likewise, the Android platform provides a stack of layers that define various mechanisms for running concurrent programs on mobile computing devices



Android's runtime contains the classes in the `java.util.concurrent` packages

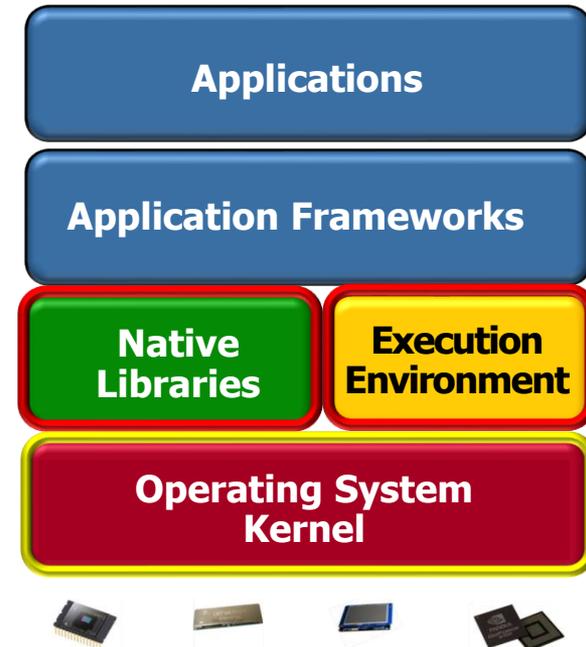
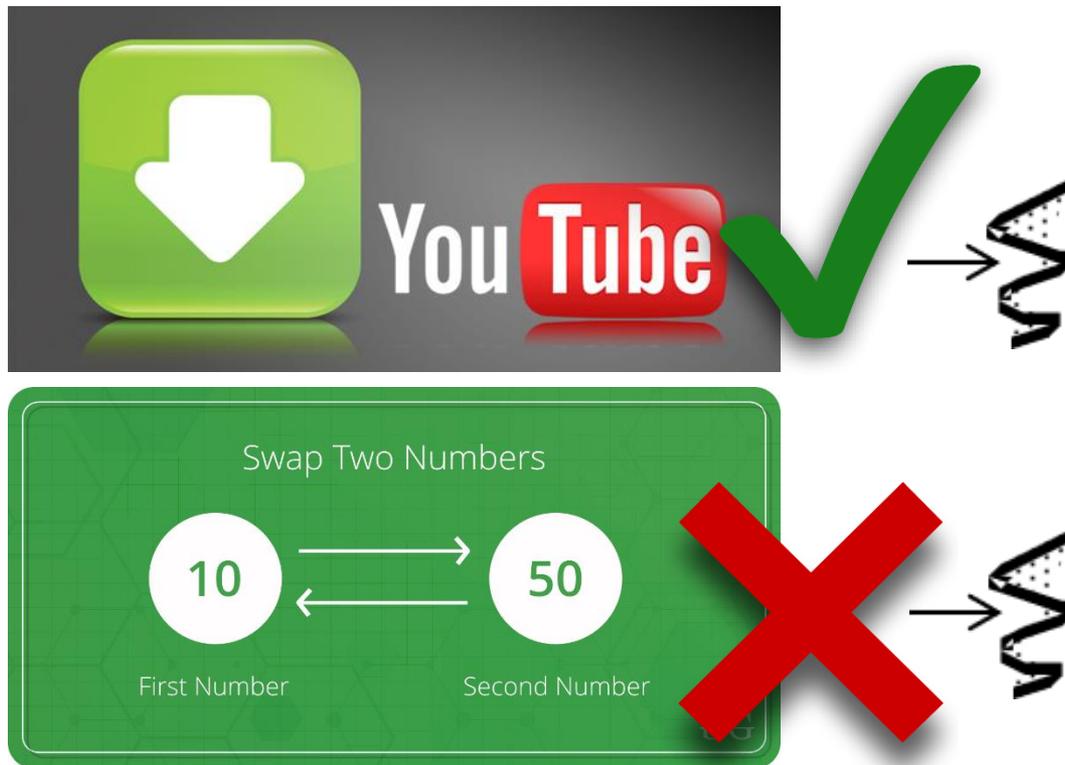
# Layers Involved in Starting a Java Thread

- Creating & starting new threads on any Java platform consumes a non-trivial amount of system resources, so use them judiciously!



# Layers Involved in Starting a Java Thread

- Creating & starting new threads on any Java platform consumes a non-trivial amount of system resources, so use them judiciously!
  - e.g., only create threads for computations that run much longer than the time needed to spawn them!



---

# End of Managing the Java Thread Lifecycle: Layers Involved in Starting a Thread